



## PJE8438

### 50V N-Channel Enhancement Mode MOSFET – ESD Protected

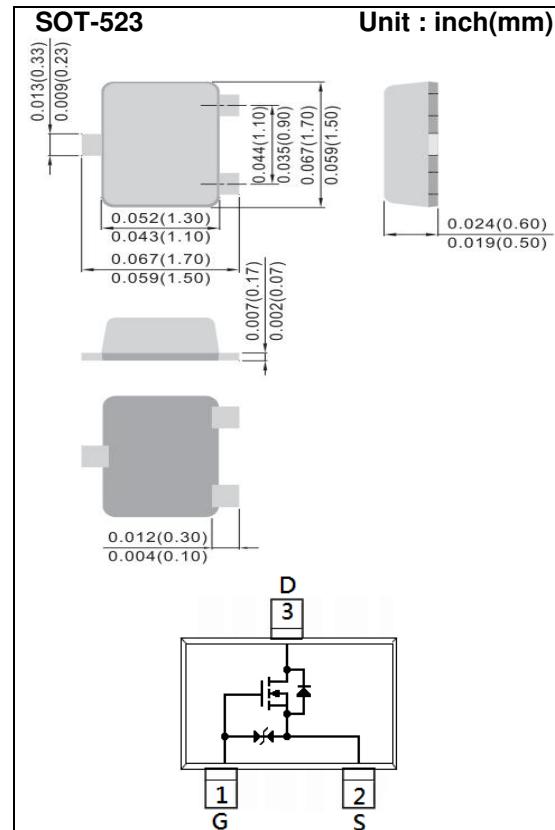
**Voltage**    **50 V**    **Current**    **360mA**

#### Features

- RDS(ON) , VGS@10V, ID@500mA<1.45Ω
- RDS(ON) , VGS@4.5V, ID@200mA<1.95Ω
- RDS(ON) , VGS@2.5V, ID@100mA<4.0Ω
- RDS(ON) , VGS@1.8V, ID@10mA<6.0Ω
- Advanced Trench Process Technology
- ESD Protected 2KV HBM
- Specially Designed for Relay driver, Speed line drive, etc.
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

#### Mechanical Data

- Case: SOT-523 Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.00007 ounces, 0.002 grams
- Marking: E38



#### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNITS
Drain-Source Voltage	$V_{DS}$	50	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	360	mA
Pulsed Drain Current	$I_{DM}$	1200	mA
Power Dissipation	$P_D$	300	mW
		2.4	$\text{mW}/^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
Typical Thermal resistance - Junction to Ambient <sup>(Note 3)</sup>	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$



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### Electrical Characteristics ( $T_A=25^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	50	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.86	1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=500mA$	-	1.2	1.45	$\Omega$
		$V_{GS}=4.5V, I_D=200mA$	-	1.3	1.95	
		$V_{GS}=2.5V, I_D=100mA$	-	1.7	4.0	
		$V_{GS}=1.8V, I_D=10mA$	-	4.0	6.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=50V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>Dynamic</b> <small>(Note 4)</small>						
Total Gate Charge	$Q_g$	$V_{DS}=25V, I_D=500mA,$ $V_{GS}=4.5V$	-	0.95	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.34	-	
Gate-Drain Charge	$Q_{gd}$		-	0.32	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	36	-	pF
Output Capacitance	$C_{oss}$		-	11	-	
Reverse Transfer Capacitance	$C_{rss}$		-	6.6	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=25V, I_D=500mA,$ $V_{GS}=10V,$ $R_G=6\Omega$ <small>(Note 1,2)</small>	-	2.3	-	ns
Turn-On Rise Time	$t_r$		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	7	-	
Turn-Off Fall Time	$t_f$		-	20	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	500	mA
Diode Forward Voltage	$V_{SD}$	$I_S=500mA, V_{GS}=0V$	-	0.9	1.5	V

#### NOTES :

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3.  $R_{eJA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. mounted on a 1 inch square pad of copper
4. Guaranteed by design, not subject to production testing.



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## TYPICAL CHARACTERISTIC CURVES

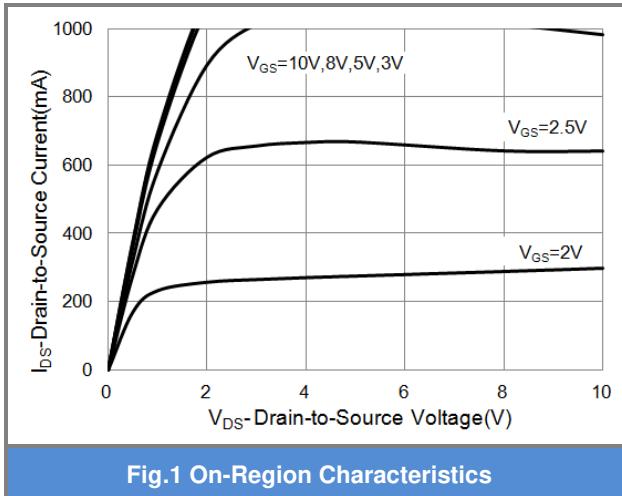


Fig.1 On-Region Characteristics

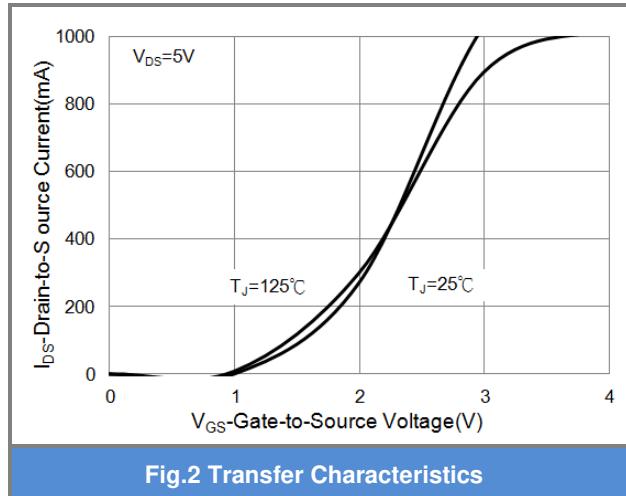


Fig.2 Transfer Characteristics

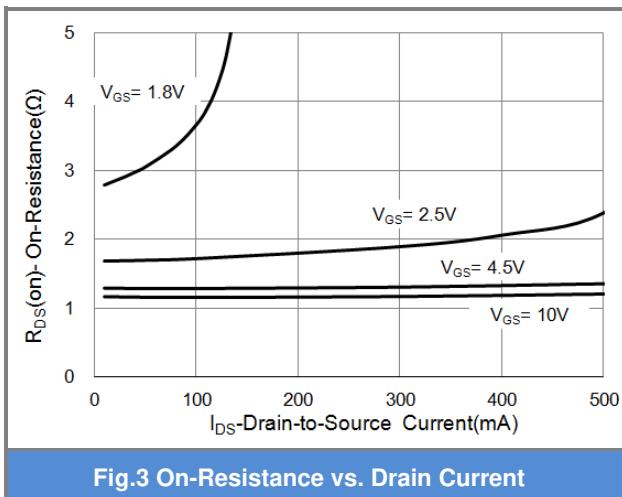


Fig.3 On-Resistance vs. Drain Current

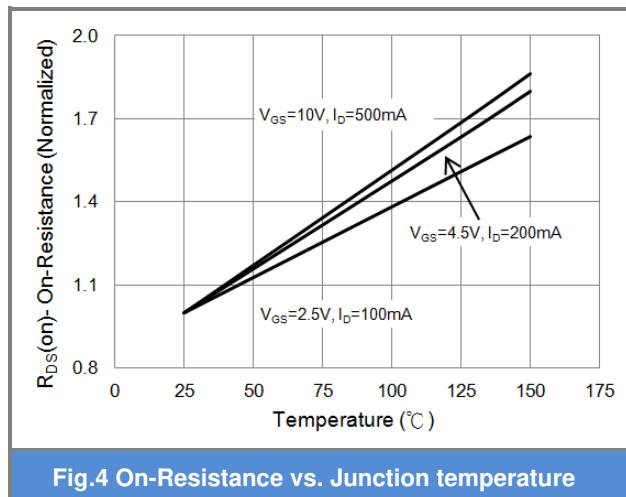


Fig.4 On-Resistance vs. Junction temperature

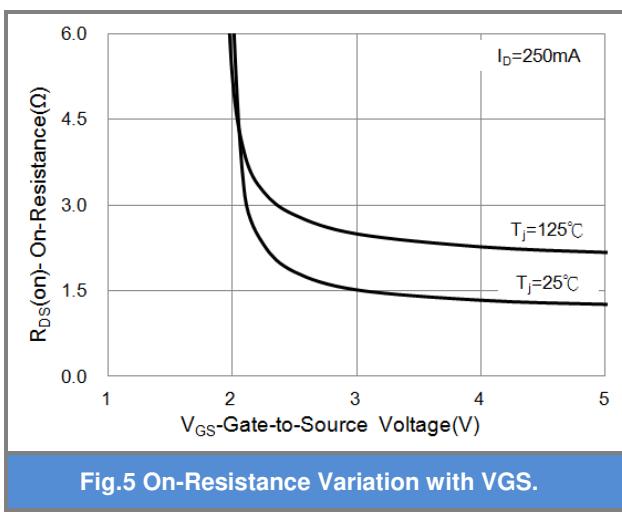


Fig.5 On-Resistance Variation with VGS.

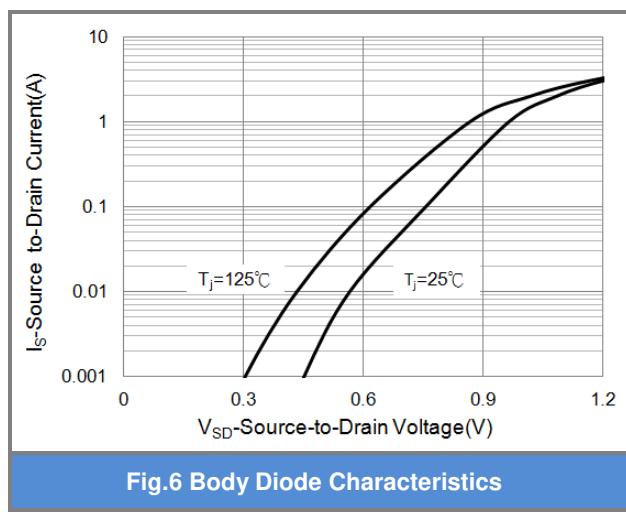


Fig.6 Body Diode Characteristics



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### TYPICAL CHARACTERISTIC CURVES

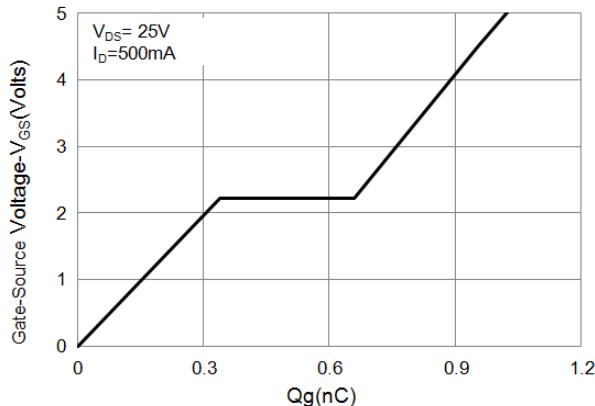


Fig.7 Gate-Charge Characteristics

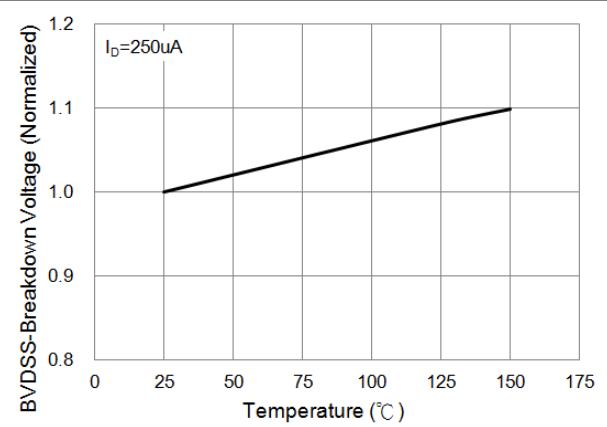


Fig.8 Breakdown Voltage Variation vs. Temperature

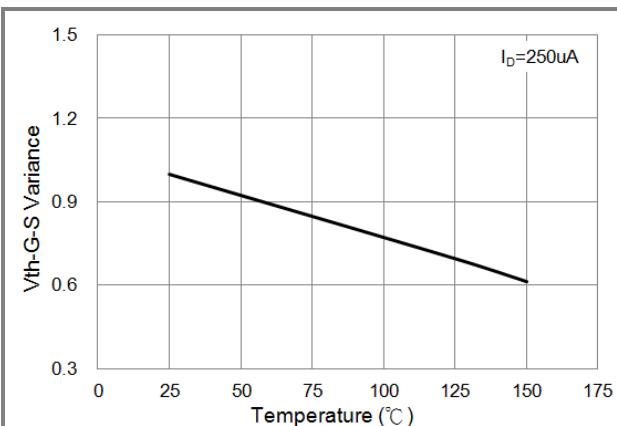


Fig.9 Threshold Voltage Variation with Temperature.

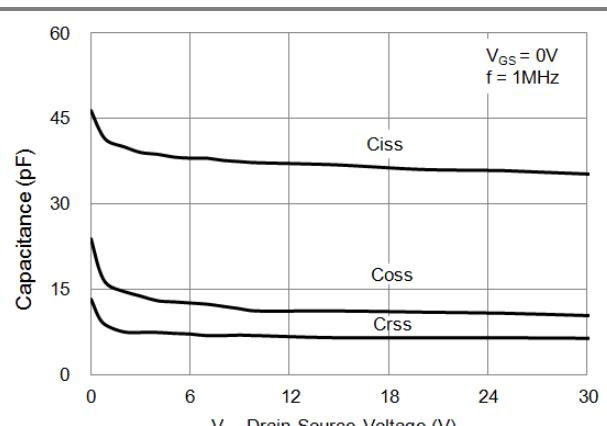


Fig.10 Capacitance vs. Drain-Source Voltage.

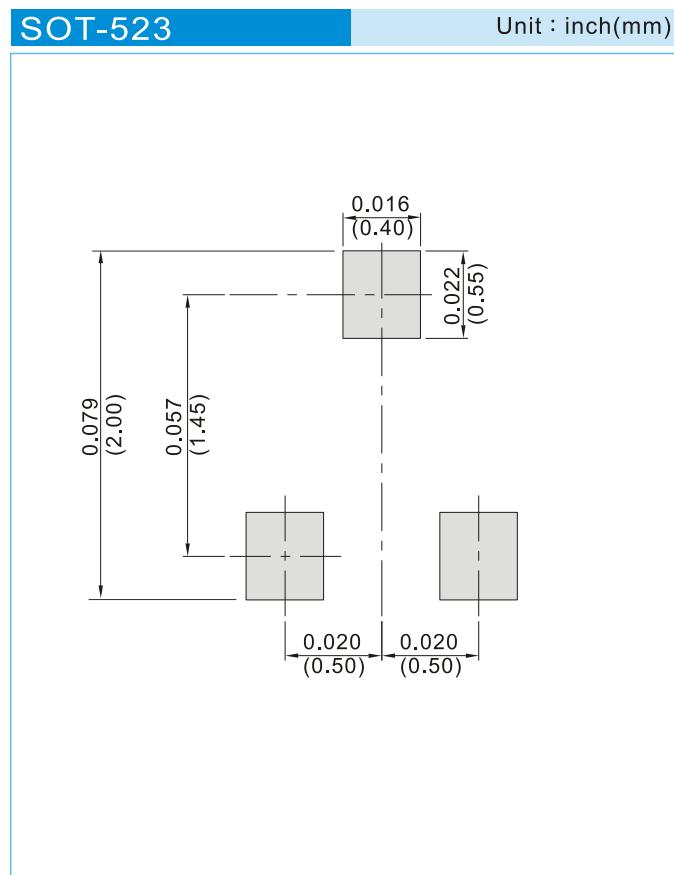


## PJE8438

### PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJE8438_R1_00001	SOT-523	4K pcs / 7" reel	E38	Halogen free

### MOUNTING PAD LAYOUT





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